Amendments to the Claims

Please cancel Claims 1, 18-21, 26 and 27. Please amend Claims 2-17. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

1. (Canceled)

2. (Currently Amended) ~~A method as claimed in Claim 1 where the additional step is added of~~ A method for generating and evaluating property estimation grids for use with a dielectrometer for measuring preselected properties of a material, said method comprising:

a) defining electrical, physical, and geometric properties for the material, including preselected properties of the material;

b) defining operating point parameters for the material properties and an electrode geometry, electrode configuration, substrate material and dimensions, and electrical source excitation for the dielectrometer;

c) inputting the material properties, the operating point parameters, and the dielectrometer electrode substrate geometry, configuration and source excitation into a model to compute an input/output terminal relation value;

d) recording in a database the terminal relation value as a property estimation grid point;

e) adjusting the preselected properties of the material and repeating steps (c) and (d) for remaining property estimation grid points; and

f) analyzing ~~the resultant grid(s)~~ a property estimation grid to determine ~~their numerical properties and properties as mappings between measurement and property spaces to allow their comparison, determination of~~ fitness of the property estimation grid for a particular measurement. ~~various measurements and the implications upon the whole measurement strategy, and to allow selection among grid and measurement alternatives~~

3. (Currently Amended) A method as claimed in Claim ~~1~~ 2 wherein the terminal relation ~~values~~ value of ~~part~~ step (c) ~~are~~ is at least one of: transcapacitance value, ~~and~~ transconductance ~~values;~~ value, transadmittance ~~values~~ value, transimpedance ~~values;~~ value, self-admittance ~~values~~; value, self-impedance ~~values;~~ value, and complex gain~~; or any electrical equivalent circuit or network representation~~.

4. (Currently Amended) ~~A method as claimed in Claim 1~~
A method for generating and evaluating property estimation grids for use with a dielectrometer for measuring preselected properties of a material, said method comprising:

a) defining electrical, physical, and geometric properties for the material, including preselected properties of the material;

b) defining operating point parameters for the material properties and an electrode geometry, electrode configuration, substrate material and dimensions, and electrical source excitation for the dielectrometer;

c) inputting the material properties, the operating point parameters, and the dielectrometer electrode substrate geometry, configuration and source excitation into a model to compute an input/output terminal relation value;

d) recording in a database the terminal relation value as a property estimation grid point;

e) adjusting the preselected properties of the material and repeating steps (c) and (d) for remaining property estimation grid points wherein one or more of the operating point parameters in ~~parts b) and c)~~ steps (b) and (c) are single or multiple shims of known property and geometry.

5. (Currently Amended) A method as claimed in Claim ~~1~~ 2 wherein ~~one of the operating point materials in parts b) and c) is a variable~~ the material comprises a liquid mixture of unknown properties.

6. (Currently Amended) A method as claimed in Claim ~~1~~ 2 further comprising: the step of

plotting ~~the~~ terminal relation values on a single or multidimensional grid.

7. (Currently Amended) A method as claimed in Claim ~~1~~ 2 ~~where~~ wherein the grid points ~~are~~ represent magnitude and phase measurements for a single wavelength dielectric sensor.

8. (Currently Amended) A method as claimed in Claim ~~1~~ 2 ~~where the grid points are magnitude at one wavelength and magnitude at a second wavelength~~ wherein the property estimation grids are magnitude-magnitude grids.

9. (Currently Amended) A method as claimed in Claim 8 ~~where~~ wherein the magnitude-magnitude grids are used for measurements performed on ~~substantially nonconducting media~~ a semi-insulating material.

10. (Currently Amended) A method as claimed in Claim ~~1~~ 2 ~~where the grid points are~~ wherein one axis of a property estimation gridrepresents a magnitude or phase measured with a dielectric sensor and a second axis represents a parameter measured with a non-dielectric sensor.

11. (Currently Amended) A method as claimed in Claim ~~1~~ 2 wherein one or more of the operating point parameters in steps (b) and (c) ~~are~~ is temperature dependent and wherein variations in the temperature are used to alter the operating point.

12. (Currently Amended) A method as claimed in Claim 2, further comprising ~~wherein step b) comprises~~:

~~defining initial dielectrometer operating point parameters and an electrode geometry, electrode configuration, substrate material and geometry, and electrical source excitation for the dielectrometer;~~

~~inputting the material properties, the dielectrometer operating point parameters, and the dielectrometer electrode geometry, configuration, substrate material and~~

~~geometry, and source excitation into a model to compute an input/output terminal relation value;~~

~~adjusting the preselected properties of the material to compute another terminal relation value;~~ computing ~~the~~ Jacobian elements which are measures of ~~the~~ variation in ~~said~~ computed terminal relation values due to ~~the~~ variation in the preselected material properties;

computing a singular value decomposition for the Jacobian elements to obtain singular values, singular vectors and condition ~~number~~ numbers of the Jacobian elements;

evaluating ~~sensitivity, selectivity, and dynamic range of~~ at least one of: the dielectrometer electrode, ~~and~~ substrate structures and operating point using the singular values, singular vectors, and the condition numbers for material property estimate requirements;

adjusting at least one of: the dielectrometer operating point parameters, ~~and~~ electrode geometry, configuration, substrate material and geometry, and the source excitation; and

repeating ~~Steps~~ steps (b) - (f) until ~~the~~ material property estimate requirements are achieved.

13. (Currently Amended) A method as claimed in Claim 12 wherein the singular values, singular vectors, and the condition ~~number~~ numbers are stored with grid points ~~to support a grid interpolation algorithm to obtain property estimates~~.

14. (Currently Amended) A ~~property estimator~~ method as claimed in Claim 12, ~~wherein the property analyzer converts~~ further comprising:

converting each sensed electromagnetic response into a transadmittance or transimpedance magnitude and phase or equivalently into real and imaginary parts~~, or into equivalent electrical circuit or network representation~~.

15. (Currently Amended) A method as claimed in Claim ~~1~~ 2 ~~where~~ wherein the material under test is composed at least in part of a viscous material.

16. (Currently Amended) A method as claimed in Claim 15 ~~where~~ wherein the viscous material is curable ~~such as an epoxy~~.

17. (Currently Amended) A method as claimed in Claim 15 ~~where~~ wherein the material is monitored ~~in an on-line configuration~~ as part of a quality control process.

18 - 21 (Canceled)

22. (Withdrawn) A sensor comprising:

a first and a second interdigital conductors; and

a meandering conductor which has elements which parallel the first interdigital conductor.

23. (Withdrawn) A sensor of claim 22 wherein the elements of the meandering conductor are equally spaced on either side of each of the digits of the first interdigital conductor.

24. (Withdrawn) A sensor of claim 23 wherein the ratio of the distance between the digits of the first interdigital conductor and the elements of the meandering conductor and the distance between the digits of the first interdigital conductor and the digits of the second interdigital conductor is approximately 1.6

25. (Withdrawn) A sensor of claim 23 further comprising a switching device for selecting one of the first interdigital conductor, the second interdigital conductor and the meandering conductor as a driven electrode, selecting another of the first interdigital conductor, the second interdigital conductor and the meandering conductor as a sensing electrode and selecting the last as a guard electrode.

26. (Canceled)

27. (Canceled)

28. (Withdrawn) A method of determining properties of material under test comprising the steps of:

providing a pair of substantially identical sensors;

immersing the material under test in a first liquid dielectric;

pressing one of the sensors against the material under test;

immersing the other sensor in the first liquid dielectric and spaced from the material under test;

measuring the capacitance of each of the two sensors;

adding a second miscible liquid with a higher dielectric permittivity to the first liquid; and

comparing the capacitance of the sensors as the second liquid is added.

29. (Withdrawn) A method of determining properties of material under test of claim 28 wherein when the two capacitances of the two sensors become identical, the liquid mixture dielectric permittivity equals the dielectric permittivity of the material under test.